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A STUDY OF THE *LENTA* GROUP OF THE GENUS *LYCOSA*, WITH DESCRIPTIONS OF NEW SPECIES (ARANEAE, LYCOSIDAE)[1]

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Lycosa lenta Hentz is a name that has been applied to spiders of widespread occurrence in the southeastern United States. Spiders resembling "*lenta*" in appearance occur abundantly in most of the land habitats of Florida, in the southern part of the Atlantic coastal plain and westward into Texas. They are an especially prominent part of the ground fauna in xeric situations and form a considerable part of the spider population of the forest floor in hammocks and other types of mesic situations.

Recent studies of a large series of specimens have shown that two or more species have been confused under this name; in addition, several new, closely related species have been brought to light. In all, some seven or more species, which are almost identical in appearance but which differ from each other in genitalia, range and ecology, may be recognized. Unfortunately, Hentz's name cannot be applied with certainty to any one of these species.

Since none of Hentz's specimens has been preserved, we must rely entirely upon his all too scanty diagnoses in attempting to apply the names which he proposed. Two important discrepancies occur in his description of *lenta*, i.e., (1) Pennsylvania, the first locality cited, no longer yields specimens of "*lenta*," and (2) his figure of the venter has a central light area and resembles that of *Schizocosa avida* (Walckenaer). The first discrepancy indicates the inclusion of a Pennsylvania species, not one of the "*lenta* group," since none is known from there; the second indicates the inclusion of *Schizocosa avida* (Walckenaer), which, in his description of *L. erratica* [=*avida* Walckenaer], he admits to confusing with his "*lenta*." Furthermore, the description is not diagnostic and cannot be interpreted as applying to any particular species. Hence, in order to use the name *lenta* in the future with a minimum of confusion, I propose to limit that usage to a species which agrees well with Hentz's description and which occurs in North Carolina, the second locality cited by him. This species is widely distributed on the Atlantic coastal plain and in Florida. I have selected and described a pair of neotypes from North Carolina.

Although I have compiled a complete list of references to the species of this group, it is not included in this paper, since a great many of the published records cannot be referred to any one species with certainty. Only the more important sources are given and these are to be found with the description of *Lycosa lenta* Hentz, p. 5.

METHODS OF COLLECTION AND PRESERVATION

All the members of this group with which I am familiar are nocturnal in habit, spending the daytime in burrows, under logs, stones, etc., and emerging at dusk, or shortly thereafter, to spend the remainder of the night wandering about in search of prey. Since the eyes of these spiders shine brilliantly in the beam of a flashlight, collecting them at night is a simple matter, and large series may be readily obtained. Interestingly enough, at least two of these species (*lenta* and *ammophila*) spin excellent wafer-type trap-doors, although they wander widely from their burrows and are usually unable to find their way back when disturbed. These doors probably account

[1] A contribution from the Department of Biology, University of Florida, Gainesville, Florida.

for the fact that the burrows of these spiders are usually not observable, even in areas that are densely populated.

For preservation, specimens were dropped into 95 per cent ethyl alcohol. When vials or bottles were crowded, the alcohol was changed once or twice, depending upon the condition of the specimens.

The drawings were made to scale, using a binocular microscope, with the aid of a glass disk, which had been ruled into squares, in one of the oculars.

Colors given in the description were determined by comparing specimens with the colors in Ridgway, 1912.[1]

I wish to express my gratitude to all who have contributed or lent specimens; their names are listed as part of the recorded data. I am especially indebted to Professor T. H. Hubbell for reading and criticizing the manuscript.

Only a few records for Alachua Co., Florida, are included in this paper due to the fact that the author is preparing a paper on the ecology of the wolf-spiders of that county, in which the majority of his records will be given.

SPECIES RELATIONSHIPS

The populations included in the present study fall into two groups on a basis of the structural details of the genitalia. *L. tigana* Gertsch and Wallace and *L. pseudoceratiola*, new species, belong in one group; the latter species does not resemble in appearance the other members of the group as much as it does *L. ceratiola* Gertsch and Wallace, a distantly related species. All the remaining species belong in the second group, and all these species resemble each other in appearance. *L. tigana* also somewhat closely resembles in appearance the members of this second group. The members of this group appear to fall into several distinct subgroups on a basis of differences in their genitalia. A brief account of the groupings outlined above follows:

THE LENTA GROUP

Group A

Characters: epigynum with narrow furrows alongside the guide (Figs. 24, 25); median apophysis of the same fundamental design and differing from those in Group B (Figs. 14–17); guide of the embolus (Fig. 1A) not extenuate as in Group B but somewhat truncate.

Forms included: *L. tigana* and *L. pseudoceratiola*.

Group B

Characters: furrows alongside the guide of the epigynum not narrow, more or less expanded laterally, shallow or deep; median apophysis variable in design; guide of the embolus not truncate but extenuate, somewhat drawn out into a sharp point; all the members of this group resemble each other in appearance.

Forms included:

Sub-group 1.—Guide of epigynum much broader posteriorly than anteriorly (Fig. 18); for median apophysis see Figs. 1–4. ..... *L. lenta* and *L. retenta*.

Sub-group 2.—Guide of epigynum not much broader posteriorly than anteriorly, usually less than 1.0 mm. long; median apophysis like that of Figs. 5–6. ..... *timuqua*.

Sub-group 3.—Guide of epigynum not much broader posteriorly than anteriorly, 1.2 mm. long or longer; furrows alongside the guide shallow or deep; median apophysis of several distinct designs.

..... *miami*.
..... *ammophila*.
..... *ericeticola*.

The groupings and relationships indicated above were first worked out on the basis of morphology and coloration. They were then considered in the light of the geographic and ecological distribution of the species, and this test furnished additional evidence in their support. The distribution of the various species and species groups was found to accord with the generally accepted zoögeographic principle that the most nearly allied forms are usually to be found in adjacent geographic areas or ecological environments and not in the same nor in distant or unrelated situations. This is clearly evidenced in the case of *lenta* and *retenta*, which are somewhat closely related species occupying adjacent ranges, and in *miami*, *ammophila* and *ericeticola*—Florida species which appear to occupy distinct and isolated areas of xeric sandy environment.

[1] Ridgway, Robert, 1912, Color Standards and Color Nomenclature. Washington, D. C.

Considering the forms of each group in more detail, it appears that the members of Group A (*pseudoceratiola* and *tigana*) are now isolated, the former occurring only on the southern half of the eastern coast of Florida, the latter in Texas. This bespeaks a greater age for these species than for the remainder. In Group B, the members of Sub-group 1 (*lenta* and *retenta*) are fairly closely related but clearly distinct and occupy distinct but adjacent ranges as illustrated on the map (Fig. 26). In Subgroup 2 we find a single species (*timuqua*) which is widely distributed (Fig. 27) and shows some evidence of incipient speciation at one point within its range. In Subgroup 3 relationships are very close; there is evidence both of incipient speciation (raciation) and of recently accomplished speciation (Fig. 28). All of the species of this group (*miami*, *ammophila* and *ericeticola*) have practically identical epigyna; the characteristically deep and precipitous-sided furrows alongside the guide in *L. miami* show enough variation in this feature to make it an unreliable character upon which to separate the females of *miami* from those of the other two species. The median apophyses of all three species are evidently built on the same fundamental plan, although they are quite distinct from one another in important details. *L. ammophila* appears to comprise a continuous population from central Florida to Alabama, but one in which a gradation in type occurs from east to west. Females from the different parts of the range are indistinguishable, but when males from Alachua and Escambia counties are compared they are found to differ in genitalia fully as much as many recognized species of Lycosids. However, those from Leon and Liberty counties have male genitalia almost midway between the Alachua and Escambia extremes, and there appears to be no reason to believe that the entire population is not a single but variable species forming a cline. I have several males of *ammophila* from Putnam County that are disturbingly like the Leon County form, but there is as yet no sufficient information upon which to decide whether they represent a local variant type or intergrades.

Finally, when one considers the distribution of the groups and sub-groups as units, superposition of ranges is evident. This may be the result of a separation of long standing, during which time the descendants of species originally located in adjacent ranges have crossed their original barriers to occupy parts of the same geographical areas (further evidenced in the case of Group A by the isolation of its species); or it may be that each group has developed, in much the same territory where it is now found, from an ancestral type which differed in ecological requirements from those ancestral to the other groups.

Lycosa pseudoceratiola, new species

Figures 14, 15, 24

HOLOTYPE.—Male, from Indian River Co., Fla., 110.8 miles south of New Smyrna, Aug. 29, 1938 (Cat. 1039); allotype, a female with the same data; both in collection of The American Museum of Natural History, New York.

DESCRIPTION OF HOLOTYPE.—In alcohol. Ground color of carapace near Xanthine Orange; dorsal groove enclosed by light area which ends anteriorly in three prongs; a light streak behind each posterior lateral eye. Total effect of markings on carapace similar to that of *L. ceratiola* Gertsch and Wallace, with which this species may be easily confused. Dorsum and sides of abdomen Pale Yellow-Orange; venter and genital area black; dorsum with hastate mark and a pair of dots which occur about midway between the spinnerets and the posterior end of the hastate mark. Coxae, labium and endites dusky; sternum black. Femora all legs below same color as abdomen above; distal joints darker and redder.

Carapace longer than wide (7.7 mm./5.9 mm.), 2.7 mm. high; width of the head, 3.2 mm. opposite posterior lateral eyes. Posterior eye quadrangle wider than long (2.2 mm./1.8 mm.), eyes of the median row slightly larger than those of the posterior (0.8 mm./0.7 mm.); median row wider than the anterior row (1.9 mm./1.4 mm.). Anterior row of eyes procurved, eyes evenly spaced, medians look to be at least twice the diameter of the laterals and measure 0.4+ mm. and 0.2 mm. Lower margin of the furrow of the chelicerae armed with three equal teeth, equally spaced. Distance from the top of the posterior median eye to clypeus equals 1.2 mm. Palpal joints: femur 3.2 mm., patella 1.5 mm., tibia 1.4 mm., cymbium 2.9 mm. Legs 4123.

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	7.2	3.2	5.8	6.3	3.6	26.1
II	6.9	3.1	5.5	6.3	3.6	25.4
III	6.2	2.6	3.7	6.3	3.7	22.5
IV	7.5	3.1	6.2	8.4	4.5	29.7

DESCRIPTION OF ALLOTYPE.—In alcohol. Legs and carapace lighter than in the holotype, pattern of the carapace similar to, but not so distinct as, that in the holotype. Dorsum of abdomen Pale Yellow-Orange, practically immaculate; venter black. Spines on tibiae I and II beneath, much reduced, bristle-like, approaching the condition of *L. ceratiola* Gertsch and Wallace. Sternum black; labium, endites and coxae dusky.

Carapace longer than wide (8.1 mm./6.1 mm.), 2.8 mm. high; width of the head 3.9 mm. Posterior eye quadrangle wider than long (2.6 mm./2.1 mm.), median eyes larger than laterals (0.9 mm./0.8 mm.). Posterior median row wider than anterior row (2.1 mm./1.7 mm.); anterior row of eyes procurved, eyes equally spaced, medians twice as large as laterals (0.5 mm./0.2 mm.). Lower margin of the furrow of the chelicerae armed with three equal teeth, equally spaced. Distance from the top of the posterior median eye to clypeus equals 1.4 mm. Palpal joints: femur 3.3 mm., patella 1.6 mm., tibia 1.9 mm., tarsus and claw 2.8 mm. Distance from the posterior edge of the epigynum to the anterior end of the furrow of the epigynum 1.6 mm. Legs 4123.

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	6.8	3.4	5.3	4.9	2.9	23.3
II	6.5	3.3	5.0	5.0	2.9	22.7
III	5.9	2.9	4.3	5.5	3.2	21.8
IV	7.2	3.1	6.0	7.9	4.1	28.3

SPECIMENS RECORDED.—11 ♂♂, 69 ♀♀ = 80; also numerous immatures.

GEOGRAPHIC DISTRIBUTION.—This species is apparently confined to the eastern coast of Florida south of Brevard County. In Dade County it has been taken only on one of the keys off Miami.

RECORDS.—FLORIDA: *Dade Co.:* Virginia Key, June 17, 1937—1 ♂, 6 ♀♀ ("along beach and in interior"—F. N. Young and L. Berner). *Indian River Co.:* Sebastian, July 30, A. P. Kroegal—1 ♀, immatures (M.C.Z.); 110.8 miles south New Smyrna, Aug. 29, 1938, Cat. 1039–5 ♂♂, 21 ♀♀, numerous immatures. *Martin Co.:* Jensen, July 4, 1935, Cat. 441—14 ♀♀, 2 penultimate ♀♀. *Palm Beach Co.:* near Jupiter (?), 164.8 miles south New Smyrna, Aug. 29, 1938, Cat. 1039-A—1 ♀; Lake Worth, Feb.–Mar., 1938, George Campbell—4 ♂♂, 17 ♀♀, 6 small immatures; West Palm Beach, Feb. 14, 1936, Cat. 530—9 ♀♀, penultimate ♂♂ and other immatures; Lake Worth—1 ♂ (M.C.Z.).

REMARKS.—The small amount of data available indicates that this species is an inhabitant of what might be called "coastal sand scrub," or similarly xeric situations. It has not been taken far inland, nor is it a beach form. I believe this species occupies, within its range, a niche similar to that occupied by *L. ceratiola* farther north and inland in Florida. *L. pseudoceratiola* receives its name because of its resemblance to *L. ceratiola* Gertsch and Wallace, a species to which it is only distantly related. The resemblance in external appearance and in the habitats occupied by these two species is interesting in view of the fact that their genitalia bear evidence of long separation. When I first began to collect the new species I thought I had a variant of *L. ceratiola*, within which I had already found considerable variation and varieties of which I was hunting at the time. For several years I thought I had only females of *pseudoceratiola* but finally discovered that I was confusing the males of two species from the lower east coast of Florida—*pseudoceratiola* and *miami*. Females of the former species may be identified by referring to the figures of the genitalia. *Pseudoceratiola* females resemble *ceratiola* in external appearance and in the spining of tibiae I and II; they differ from *miami* in appearance and spining. Males of *pseudoceratiola* resemble *ceratiola* but differ from *miami* in appearance; their palpi are quite removed in appearance and relationship from *ceratiola*, whereas only the closest scrutiny will disclose the differences between the palpi of *pseudoceratiola* and *miami*. They differ mainly in the length and configuration of the guide of the embolus. Their median apophyses are almost identical in appearance. I believe this similarity is not a result of immediate relationship but rather is due to parallel development. When the epigyna of these

two species are compared, and their general appearance, etc., is taken into consideration, one must conclude that they are no more closely related to each other than either is to *ceratiola* or the other members of the *lenta* group. *Pseudoceratiola* appears to me to have had a long separate period of development.

Lycosa tigana Gertsch and Wallace

Figures 16, 17, 25

Lycosa tigana GERTSCH AND WALLACE, 1935, American Museum Novitates, No. 794, pp. 14–17, Fig. 32. [Male holotype and paratype from Edinburg, Texas (S. Mulaik), in the collection of The American Museum of Natural History, New York.]—GERTSCH AND WALLACE, 1937, American Museum Novitates, No. 919, pp. 6–7, Fig. 6.

RECORDS.—TEXAS: *Hidalgo Co.:* Edinburg, June 1, 1935, Mulaik—1 ♂; Edinburg, Apr. 1, 1936, Combs—4 ♂♂, 3 ♀♀, 4 immatures; Edinburg, Mar. 1, 1936, J. D. Lyon—11 ♂♂, 3 ♀♀, 2 immatures; Edinburg, Mar. 24–26, 1936, Mulaik—11 ♂♂, 4 ♀♀, 2 immatures. *Nueces Co.:* Corpus Christi State Park, Dec. 17, 1939, F. N. Norman—7 ♂♂, 12 ♀♀, numerous immatures. *Starr Co.:* 5 miles south of Rio Grande City, Oct. 26, 1935, Welch—1 ♂, 2 ♀♀, 3 immatures. *Webb Co.:* Laredo, Dec. 18, 1939, F. N. Norman—2 ♂♂, 5 ♀♀, many immatures.

REMARKS.—Based on a study of the genitalia this species appears to be most closely related to *pseudoceratiola*, new species. However, in appearance it resembles the other members of the *lenta* group more than it does *pseudoceratiola*.

Lycosa lenta Hentz

Figures 1, 2, 18

Lycosa lenta HENTZ [in part], 1844, Jour. Boston Soc. Nat. Hist., IV, p. 386, Pl. XVII, figs. 1–4.—HENTZ, 1875, Occ. Papers Boston Soc. Nat. Hist., p. 27, Pl. III, figs. 1–4. [No types were selected; none of Hentz's specimens has been preserved.]—BANKS [in part], (?) 1904, Jour. N. Y. Ent. Soc., XII, p. 114.—CHAMBERLIN [in part], 1908, Proc. Acad. Nat. Sci. Philadelphia, LX, pp. 243–246, Pl. XVIII, figs. 8–9.

NEOTYPES.—Male and female from Burlington, Alamance Co. North Carolina, Sept. 19, 1935, H. K. Wallace, Cat. No. 467; both in the collection of The American Museum of Natural History, New York.

DESCRIPTION OF MALE NEOTYPE.—In alcohol. Ground color of carapace and legs from above, near Orange; abdomen near Pale Orange-Yellow; dorsal stripe as wide as the diameter of a posterior lateral eye, extending from posterior margin of the carapace to the posterior median eye, sides of carapace darker than dorsal stripe, marked with radially arranged light and dark streaks; marginal light area wider than dorsal stripe, enclosing scattered dark spots; the whole carapace covered with fine pubescence of light and dark hairs; sides of the head light. Dorsum of abdomen with indistinct markings behind the distinct hastate mark. Sternum, labium and venter black; coxae dusky. Legs not annulate, metatarsi and tarsi I and II and distal one-half tibia I darker than the other segments; all segments of palpus, except cymbium, light. Spining of all tibiae beneath 2:2:2. Lower margin of the furrow of the chelicerae with three teeth, about equally spaced, lateral tooth slightly smaller than the other two; upper margin with three unequal teeth, spaced 2:1, middle tooth the largest.

Carapace longer than wide (8.6 mm./6.5 mm.), 3.5 mm. high; width of the head 3.9 mm. Posterior eye quadrangle wider than long (2.1 mm./1.7 mm.), eyes of the median row larger than those of the posterior (0.9 mm./0.7 mm.); median row wider than the anterior row (1.8 mm./1.7 mm.). Anterior row of eyes only slightly procurved, medians closer to each other than to the laterals; medians about twice as large as laterals (approximately 0.5 mm./0.3 mm.). Distance from top of posterior median eye to clypeus 1.2 mm. Palpal segments: femur 3.6 mm., patella 1.7 mm., tibia 1.7 mm., cymbium 3.0 mm. Legs 4123.

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	7.4	3.4	6.0	6.6	4.0	27.4
II	6.8	3.3	5.3	6.1	3.6	25.1
III	6.3	2.8	4.3	5.9	3.3	22.5
IV	7.7	3.3	6.2	9.0	4.4	30.5

DESCRIPTION OF FEMALE NEOTYPE.—In alcohol. Resembles the male in color and markings except: (1) the dorsal stripe and marginal areas on carapace are not so distinct, (2) the hastate mark on the dorsum is indistinct, (3) the distal segments of legs I and II are not any darker than those of legs III and IV.

Carapace longer than wide (8.7 mm./6.3 mm.), 3.0 mm. high; width of the head 4.4 mm. Posterior eye quadrangle wider than long (2.3 mm./1.7 mm.), median eyes larger than the posteriors (approximately 0.8 mm./0.6 mm.); median row wider than the anterior row (1.8 mm./1.6 mm.). Anterior row of eyes only slightly procurved, medians closer to each other than to the laterals; median eyes not twice as large as laterals (approximately 0.4 mm./0.3 mm.). Lower margin of the furrow of the chelicera armed as in the male. Distance from top of posterior median eye to clypeus 1.2 mm. Palpal segments: femur, 3.4 mm., patella 1.6 mm., tibia 1.7 mm., tarsus and claw 2.7 mm. Distance from the posterior edge of the epigynum to the anterior end of the furrow of the epigynum 1.5 mm. Legs 4123.

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	6.3	3.4	4.7	4.5	2.8	21.7
II	5.8	3.1	4.2	4.4	2.7	20.2
III	5.2	2.7	3.5	4.7	2.7	18.8
IV	6.7	3.0	5.4	7.4	3.5	26.0

VARIATIONS.—*Lycosa lenta*, occurring from North Carolina to Texas and south in Florida at least to Lake Okeechobee, probably has the most extensive range of any of the species of the "*lenta* group." Throughout this large area the species remains quite uniform in structure and in general appearance, particularly with reference to the genitalia. In Florida, at least, local variation in size is a common phenomenon, some mature specimens being three times as large as others. Local variation in color is also frequently encountered. The background against which it lives apparently has something to do with the lightness or darkness of its pattern; when taken in burned-over areas it is frequently quite dark. In spite of this variation the species can be recognized by the genitalia. The median apophysis of the male palpus has a constant and uniform shape, while the guide of the epigynum always is considerably widened posteriorly, and the furrows are usually constricted anteriorly; these conditions are illustrated in Figs. 1, 2 and 18. In North Carolina the median apophysis has a trace of an inner flange not found in Florida specimens but in every other respect is identical with the Florida form.

SPECIMENS RECORDED.—127 ♂♂, 212 ♀♀ = 339.

DISTRIBUTION.—Atlantic and Gulf coastal plains from North Carolina to Texas; Florida as far south as Lake Okeechobee. One record from Key West is included; however, I believe the locality for this specimen is incorrect.

RECORDS.—ALABAMA: *Baldwin Co.:* Foley, Jan. 25, 1912, H. H. Smith—1 ♀ (Cornell); 5 miles south of Bay Minette, Apr. 5, 1938, Hobbs and Marchand—♂♂, ♀. *Lee Co.:* Auburn—3 ♂♂, 2 ♀♀ (M.C.Z.); Auburn—2 ♂♂, 4 ♀♀ (M.C.Z.); Auburn, July 20, 1924, H. G. Good—1 ♀ (Cornell). *St. Clair Co.:* Gallant, June, 1911, H. H. Smith—1 ♀ (Cornell).

FLORIDA: *Alachua Co.:* Gainesville, May 1, 1936, Cat. 549—1 ♀; Gainesville, May 14, 1937, Cat. 611—1 ♂, 2 ♀♀; Gainesville, May 14, 1937, Cat. 611-A—2 ♂♂, 4 ♀♀. *Brevard Co.:* Melbourne, May 15, 1936, Cat. 556—4 ♂♂, 7 ♀♀; Melbourne, May 15, 1936, Cat. 556-A—1 ♀; Titusville, Apr. 1, 1937, H. H. Hobbs, Jr.—2 ♂♂, 1 ♀, immatures. *Calhoun Co.:* Blountstown, Apr. 17, 1938, W. J. Gertsch—1 ♂, 5 ♀♀. *Clay Co.:* Keystone Heights, Feb. 5, 1938, Cat. 1096—1 juv. ♂, 2 ♀♀. *Columbia Co.:* Blount's Ferry, Apr. 27, 1935, Cat. 402—1 ♀. *Escambia Co.:* Perdido River, Apr. 6, 1934, Cat. 280—1 ♂, 4 ♀♀. *Gadsden Co.:* Quincy, Nov. 28, 1934, Cat. 353-C—3 ♂♂; Quincy, Nov. 29, 1934, Cat. 356—1 ♂. (?) *Hamilton Co.:* Feb. 4, 1938, W. Beck—5 ♀♀. *Hardee Co.:* Wauchula, June 28, 1935, Cat. 427—4 ♂♂, 4 ♀♀. *Indian River Co.:* Sebastian, Mar. 27, 1919, G. Nelson—♀ with egg case containing young

(M.C.Z.). *Lake Co.:* Umatilla, Feb. 25, 1932, Cat. 40—1 ♂, 1 ♀; Umatilla, Mar. 12, 1933, Cat. 118-A—2 ♀♀; Umatilla, Apr. 21, 1933, Cat. 200—1 ♀; Umatilla, Apr. 21, 1933, Cat. 200-A—1 ♂, 2 ♀♀; Lake Harris, Apr. 22, 1933, Cat. 202—2 ♀♀; Eustis, Jan. 2, 1935, Cat. 361—4 ♀♀; Umatilla, Jan. 4, 1935, Cat. 365-A—2 ♀♀; Eustis, June 14, 1935, Cat. 409—2 ♀♀; Eustis, June 25, 1935, Cat. 416—♀♀; west end of Lake Yale, Oct. 4, 1935, Cat. 471—2 ♂♂, 7 ♀♀; Umatilla, Oct. 5, 1935, Cat. 472—1 ♂, 4 ♀♀; Eustis, Oct. 5, 1935, Cat. 473—3 ♀♀; Altoona—4 ♂♂, 1 ♀ (M.C.Z.). *Leon Co.:* 11.0 miles east of Tallahassee, July 11, 1935, Cat. 485, I. Cantrall—1 ♀; Lake Jackson, Apr. 16, 1936, Cat. 540—1 ♂. *Levy Co.:* Sea Horse Island, Apr. 28, 1934, Cat. 298—2 ♂♂, 5 ♀♀; Sea Horse Island, Mar. 30, 1935, Cat. 379—1 ♀; 5.6 miles east of Cedar Keys. Apr. 9, 1937, Cat. 593—1 ♂; 6.0 miles east of Cedar Keys, Apr. 9, 1937, Cat. 593—2 ♀♀; 9.0 miles east of Cedar Keys, Apr. 9, 1937, Cat. 595—1 ♀. *Marion Co.:* Niggertown Lake, July 25, 1938—1 ♀ (Twp 17 S, R 26 E, Sec. 22—Hubbell); Ocala National Forest, Juniper Springs, 1938, Hubbell and Friauf—1 ♀ with young. *Martin Co.:* (?) northeast shore of Lake Okeechobee, Dec. 16, 1932, A. F. Carr, Jr.—3 ♀♀. (?)*Monroe Co.:* Key West, Dec. 19, 1932, A. F. Carr, Jr.—1 ♂. *Okeechobee Co.:* southwest part of Okeechobee, Mar. 27, 1938, W. J. Gertsch—6 ♂♂, 10 ♀♀; Okeechobee, east road, Mar. 28, 1938, W. J. Gertsch—4 ♂♂, 14 ♀♀. *Orange Co.:* Orlando, 1928–1929, F. T. Van Danber—2 ♀♀ (Cornell); Orlando, Sept., 1934, K. Boyer—1 ♂, 5 ♀♀; Winter Park, Mar. 21, 1938, W. J. Gertsch—2 ♀♀. *Osceola Co.:* Runnymede—1 ♀ (M.C.Z.); 6.5 miles west of county line on U. S. 192, Apr. 1, 1939, Cat. 1082—1 ♂, 4 ♀♀, immatures. *Pasco Co.:* Dade City, Apr. 7, 1938, W. J. Gertsch—3 ♂♂, 1 ♀. *Polk Co.:* Lakeland, June 26, 1935, Cat. 420—1 ♂, 2 ♀♀; Lakeland, June 27, 1935, Cat. 422—4 ♀♀. *Putnam Co.:* Levy Prairie, May 24, 1936, Cat. 557-A—4 ♂♂, 5 ♀♀; 3.1 miles east of county line on Highway 14, Mar. 31, 1939, Cat. 1067-A—1 ♂, 1 ♀. *Sarasota Co.:* Englewood, Mar. 1, 1938, W. J. Gertsch—1 ♂. *Seminole Co.:* Sanford, June 9, 1936, Russell—1 ♀ with young; Longwood, Mar. 23, 1938, W. J. Gertsch—1 ♂. *St. Lucie Co.:* Fort Pierce, Feb. 15, 1936, Cat. 531-A—1 ♀. *Volusia Co.:* Benson Springs, Jan., 1937, George Fowles—2 ♂♂, 1 ♀, immatures.

GEORGIA: Billy's Island, Okefinokee Swamp, May 1, 1921—1 ♂, 1 ♀ (Cornell). *Clarke Co.:* Apr. 3, 1929, A. G. Richards, Jr.—1 ♀ (A.M.N.H.); Athens, Aug. 14, 1935, Cat. 453—1 ♀; Athens, May 7, 1937, Cat. 607—4 ♀♀, immatures. *Dougherty Co.:* Albany, July 18, 1938, Cat. 1036—3 ♂♂, 12 ♀♀. *DeKalb Co.:* Atlanta, 1909—2 ♀♀ (M.C.Z.); Atlanta, May 27, 1912—1 ♂ (Cornell). *Jones Co.:* Stony Creek (U. S. 19), between Gray and Macon, Apr. 30, 1938, T. H. Hubbell—1 ♀. (?)*Putnam Co.:* Eaton—1 ♂ and 2 specimens with genitalia gone (M.C.Z.). *Ware Co.:* 1.5 miles northeast of Waycross on Highway 38, May 8, 1937, Cat. 609-B—1 ♂, 1 ♀; Waycross, May 8, 1937, Cat. 609-D—1 ♂.

LOUISIANA: *St. Tammany Parish:* Covington—1 ♂, 1 ♀ (M.C.Z.).

MISSISSIPPI: *Claiborne Co.:* Alcorn, Agricultural College Mississippi, Oct., 1916, Bailey—3 ♂♂, 2 ♀♀ (Cornell). *George Co.:* Lucedale, Apr., 1931, Dietrich—1 ♀ (Cornell). *Hancock Co.:* Bay St. Louis, June 13, 1917—1 ♀ (Cornell). *Hinds Co.:* Clinton, spring 1926, Bailey—4 ♂♂, 5 ♀♀ (Cornell). *La Fayette Co.:* Oxford, June—1 ♀ (Cornell).

NORTH CAROLINA: *Alamance Co.:* Burlington, May 1, 1934, Kenneth Wallace—7 ♀♀; Burlington, July 1, 1934, Kenneth Wallace—1 ♂, 1 ♀; Burlington, Aug. 16, 1935, Cat. 454—♀, immatures; Burlington, Sept. 19, 1935, Cat. 465—9 ♂♂; Burlington, Sept. 19, 1935, Cat. 466—19 ♂♂, 7 ♀♀ (one pair observed copulating); Burlington, Sept. 19, 1935, Cat. 467—7 ♂♂, 2 ♀♀; Burlington, Sept. 19, 1935, Cat. 467-A—2 ♀♀; Burlington, Sept. 19, 1935, Cat. 468—6 ♂♂, 1 ♀. *Henderson Co.:* Hendersonville, June 14, 1935—2 ♀♀ (A.M.N.H.). *Carteret Co.:* Beaufort, Shute—1 ♀ (M.C.Z.). *Wake Co.:* Raleigh, Sept. 25–30, 1911, C. S. Brimley—

2 ♂♂, 1 immature (M.C.Z.). *County* (?): Lake Woccomaw, Apr. 10, 1929, C. R. Crosby—1 ♀ (Cornell).

SOUTH CAROLINA: *Horry Co.:* Myrtle Beach, Oct. 15, 1940, Ernst Mayr—1 ♀, immatures (A.M.N.H.).

TENNESSEE: *McMinn Co.:* 1.5 miles north of Athens, June 19, 1938—1 ♂.

TEXAS: *Travis Co.:* Austin, T. H. Montgomery—1 ♂ (A.M.N.H.).

REMARKS.—This species is an inhabitor of mesic habitats in Florida where leaf mould and shade are found, but toward the northern end of its range (as in North Carolina) it appears to inhabit much drier situations. In Florida no well-marked season of maturity can be detected for this species, but in North Carolina such a season occurs in the late summer. This species has been observed in burrows fitted with trap doors on several occasions and has spun such doors in captivity.

Lycosa retenta Gertsch and Wallace

Figures 3, 4

Lycosa retenta GERTSCH AND WALLACE, 1935, American Museum Novitates, No. 794, pp. 17–18, Fig. 30. [Male holotype and immature female allotype from Austin, Texas (T. H. Montgomery), in the collection of The American Museum of Natural History, New York.]

RECORD.—TEXAS: 23 miles east of Del River, June 30, 1935, A. H. Wright—1 ♂ (A.M.N.H.).

REMARKS.—This species is known only from Texas, and adult females have yet to be collected. It appears to be most closely related to *L. lenta* Hentz.

Lycosa timuqua, new species

Figures 5, 6, 19, 20

HOLOTYPE.—Male, from tourist camp at Jensen, Martin Co., Florida, July 4, 1935, Cat. 441; allotype, a female with the same data; both in the collection of The American Museum of Natural History, New York.

DESCRIPTION OF HOLOTYPE: In alcohol. Carapace and legs near Orange; markings similar to those of *L. lenta*. Sternum and venter black.

Carapace longer than wide (7.1 mm./5.4 mm.), 2.7 mm. high; width of the head 3.2 mm. Posterior eye quadrangle wider than long (2.1 mm./1.6 mm.), eyes of the median row larger than those of the posterior (0.8 mm./0.6 mm.); median row wider than the anterior row (1.7 mm./1.4 mm.). Anterior row of eyes almost straight, only slightly procurved, medians closer to each other than to the laterals; medians about twice as large as laterals (approximately 0.4 mm./0.3 mm.). Lower margin of the furrow of the chelicerae armed with three teeth, almost equally spaced, lateral tooth smaller than the other two. Distance from the top of the posterior median eye to the clypeus equals 1.1 mm. Palpal joints: femur 3.0 mm., patella 1.4 mm., tibia 1.5 mm., cymbium 2.7 mm. Legs 4123.

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	6.8	3.1	5.5	5.8	3.3	24.5
II	6.4	2.9	5.0	5.6	3.2	23.1
III	5.7	2.6	4.1	5.7	3.1	21.2
IV	7.1	3.0	6.0	8.4	3.8	28.3

DESCRIPTION OF ALLOTYPE: In alcohol. Legs and body near Capucine Yellow; sternum and venter black. Marked like *L. lenta*.

Carapace longer than wide (8.6 mm./6.5 mm.), 3.1 mm. high; width of the head 4.3 mm. Posterior eye quadrangle wider than long (2.4 mm./1.9 mm.), median eyes larger than the posteriors (approximately 0.9 mm./0.7 mm.); median row wider than the anterior row (2.0 mm./1.7 mm.). Anterior row of eyes slightly procurved, medians closer to each other than to the laterals; median eyes almost twice as large as laterals (approximately 0.5 mm./0.3 mm.). Lower margin of the furrow of the chelicerae armed with three teeth, about equally spaced, lateral tooth smaller than the other two. Distance from the top of the posterior median eye to clypeus equals 1.5 mm. Palpal joints: femur 3.4 mm., patella 1.6 mm., tibia 1.9 mm., tarsus and claw 2.8 mm. Distance from the posterior edge of the epigynum to the anterior end of the furrow of the epigynum 0.9 mm. Legs 4123.

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	6.7	3.5	5.0	4.9	3.0	23.1
II	6.2	3.2	4.7	4.8	2.9	21.8
III	5.7	2.9	4.0	5.2	3.0	20.8
IV	7.3	3.3	6.0	8.1	3.8	28.5

Within this species there is considerable variation in size. The holotype and allotype are medium-sized specimens. The genitalia are distinct from all the other species here described. The palpi are constant in configuration, but the epigyna vary somewhat.

In central peninsular Florida, in Orange, Osceola and Pasco counties, and on the west coast from Pinellas to Lee counties, a form occurs which is quite similar to this species but which may turn out to be distinct when more is known about its distribution, life history, etc. The palpi are almost identical with those of *timuqua*,

differing only, if at all, in size. The epigynum is different, though closely resembling that of *timuqua;* in the latter the furrows are shallow, whereas in the former they are deep and the size of the epigynum is greater. Differences in configuration are shown in Figs. 19 and 20. When one places a dozen or so specimens of the typical form from a given locality alongside a similar number of the central peninsular form the usual disparity in size, together with the difference in appearance of the epigyna, argues for distinctness, but in looking over the entire collection it becomes impossible to place satisfactorily some specimens in one group or the other. In recording the collections, data for the two forms will be given separately. *L. angusta* Tullgren is probably either what I am treating here as the central peninsular form of *timuqua* or *L. pseudoceratiola*, new species. Another candidate for Tullgren's name, but a less likely one, is *L. miami*, new species.

The data for the typical form (epigynum as in Fig. 20) are as follows:

SPECIMENS RECORDED.—81 ♂♂, 181 ♀♀, 28 immatures = 290.

DISTRIBUTION.—East coast of Florida from Brevard County southward onto the Florida Keys; northern peninsular Florida north of Orange County; Atlantic and Gulf coastal plain from South Carolina westward into Mississippi.

RECORDS.—ALABAMA: *Baldwin Co.:* 5 miles south of Bay Minette, Apr. 5, 1938, Hobbs and Marchand—4 ♂♂, 1 ♀.

FLORIDA: *Bay Co.:* Ebro, June 6, 1938—2 ♂♂, 3 ♀♀. *Brevard Co.:* Melbourne, May 15, 1936, Cat. 556-A—♂♂, ♀♀; 2.0 miles north of Melbourne, Apr. 1, 1939, Cat. 1081—5 ♂♂, 9 ♀♀. *Broward Co.:* 10.0 miles north Ft. Lauderdale, Apr. 13, 1937, F. N. Young—1 ♀. *Citrus Co.:* Sweet Gum Cavern near Floral City, Sept. 25, 1936, Cat. 566—11 ♀♀, juv. ♂♂, various sizes immatures, ♀ with egg case; Floral City, Apr. 2, 1937, Cat. 587—2 ♂♂, 1 ♀; 2 miles south of Floral City, Apr. 30, 1937, Cat. 604—3 ♂♂, 1 ♀; Sweet Gum Cavern, Jan. 29, 1937, Cat. 580—1 ♂, 1 ♀ and all sizes of immatures, adults very rare. *Dade Co.:* 15 miles north of Miami, July 3, 1935, Cat. 439—♂♂, ♀♀; Miami, Apr. 16, 1937, F. N. Young—5 ♀♀, immatures; Miami, Sept. 2, 1938—3 ♀♀, immatures. *Escambia Co.;* Pensacola, science class—1 ♂; U. S. 1 at Perdido River, Apr. 6, 1934—1 ♀; Riverview, Apr. 6, 1934, Cat. 282—2 ♂♂; 3 miles east of Perdido River, Apr. 4, 1938, Hobbs and Marchand—1 ♀. *Gadsden Co.:* Quincy, Sept. 16, 1934, J. Kilby—1 ♂, 2 ♀♀. *Indian River Co.:* Vero Beach, Apr. 21, 1936, H. T. Townsend—1 ♂, 1 ♀; Vero Beach, Mar. 17, 1936, H. T. Townsend—1 ♂; near Vero Beach, Aug. 29, 1938, Cat. 1039—6 ♀♀. *Madison Co.:* 6 miles west of Suwannee River, Feb. 4, 1938, Cat. 621—1 ♂. *Marion Co.:* Ocala National Forest, Nov. 21, 1936, Cat. 576—1 ♀; Ocala National Forest, July 27, 1938, Hubbell and Friauf—1 ♀; Juniper Springs, Sept. 4, 1938, Hubbell and Friauf—1 ♀; Ocala National Forest, Oct. 20, 1938, Cat. 1059—2 ♂♂, 5 ♀♀. *Martin Co.:* Jensen, July 4, 1935, Cat. 441—6 ♂♂, 14 ♀♀. *Monroe Co.:* Key West, Dec. 19, 1932, Cat. 53—3 ♀♀; Big Pine Key, Dec. 20, 1932, A. F. Carr, Jr.—1 ♀; Key West, June, 1934, A. F. Carr, Jr.—4 ♀♀; Key West, June 19, 1934, E. L. Pierce, Jr.—4 ♂♂; Snake Bite Canal, Cape Sable, Feb. 7, 1935, J. Kilby, Cat. 370—4 ♂♂, 3 ♀♀; East Cape, Feb. 5, 1935, J. Kilby, Cat. 371—1 ♀; Cape Sable, Feb. 7, 1935, R. E. Bellamy—1 ♂; Key West, July 2, 1935, Cat. 437, 438—14 ♀♀. *Palm Beach Co.:* West Palm Beach, Feb. 14, 1936, Cat. 530—3 ♀♀; Lake Worth, Feb.-Mar., 1938, Geo. Campbell—3 ♂♂, 14 ♀♀, immatures; near Jupiter, Aug. 29, 1938, Cat. 1039-A—2 ♀♀. *Putnam Co.:* 1.0 miles west of Palatka, Aug. 3, 1935, Cat. 446—2 ♂♂, 4 ♀♀, immatures; 16.0 miles west of Palatka, Aug. 3, 1935, Cat. 447—6 ♀♀; Carlton Lake, May 24, 1936, Cat. 557-A—2 ♂♂, 1 ♀; 3.1 miles east of Alachua County line, Mar. 31, 1939, Cat. 1067—2 ♂♂, 1 ♀; 5.4 miles east of Interlachen on Highway 14, Mar. 31, 1939, Cat. 1069—2 ♂♂, 2 ♀♀; 8.5 miles southeast of Palatka on Highway 28, Mar. 31, 1939, Cat. 1071—1 ♂, 1 ♀; 9.0 miles southeast of Palatka on Highway 28, Mar. 31, 1939, Cat. 1071-A—2 ♀♀. *Taylor Co.:* Perry,

Apr. 14, 1938, W. J. Gertsch—7 ♂♂, 5 ♀♀, 1 juv. *Volusia Co.:* 1.8 miles south of county line on U. S. 1, Apr. 1, 1939, Cat. 1074—1 ♂, 1 ♀. *Washington Co.:* 3 miles south of Chipley, Apr. 15, 1937, H. H. Hobbs, Jr.—6 ♂♂, 6 ♀♀.

GEORGIA: *Dooley Co.:* Umadilla, June 7, 1934, T. H. Hubbell—1 ♀. *Richmond Co.:* Augusta, Sept. 27, 1930, T. H. Hubbell—1 ♀. *Turner Co.:* 9 miles southeast of Sycamore, May 6, 1937, Cat. 606—5 ♂♂, 19 ♀♀, 25 immatures various sizes. *Ware Co.:* 1.5 miles northeast of Waycross, May 8, 1937, Cat. 609-A—1 ♂, 1 ♀, immatures; 1.5 miles northeast of Waycross, May 8, 1937, Cat. 609-C—1 ♂, 7 ♀♀, 2 immatures.

MISSISSIPPI: *George Co.:* Lucedale, Apr. 1931, Dietrich—1 ♂ (Cornell). *Greene Co.* (?): Avera, Mar. 15, 1932, Dietrich—1 ♂ (Cornell).

NORTH CAROLINA: *Henderson Co.:* Hendersonville, June 14, 1935—1 ♂ (A.M.N.H.).

SOUTH CAROLINA: *Aiken Co.:* 4 miles north of Aiken, July 1, 1939, Cat. 1090-A—3 ♂♂, 3 ♀♀; 4 miles north of Aiken, July 1, 1939, Cat. 1090-B—2 ♂♂, 3 ♀♀. *Kershaw Co.:* Blaney, Sept. 26, 1930, T. H. Hubbell—1 ♀.

VIRGINIA: *Halifax Co.:* June 17, 1935—1 ♂, 2 ♀♀, immatures (A.M.N.H.).

The data for the central peninsular form (epigynum as in Fig. 19) are as follows:

SPECIMENS RECORDED.—32 ♂♂, 52 ♀♀, 2 juv. ♂♂, 3 immatures = 89.

DISTRIBUTION.—Central, peninsular Florida in Orange, Osceola and Pasco counties; west coast of Florida in Pinellas and Sarasota counties.

RECORDS.—FLORIDA: *Orange Co.:* Winter Park, Mar. 21, 1938, W. J. Gertsch—5 ♂♂, 5 ♀♀; 4 miles north of Orlando, Apr. 2, 1939—3 ♂♂, 5 ♀♀, 2 juv. ♂♂, 3 immatures. *Osceola Co.:* north of Olney, Mar. 27, 1938, W. J. Gertsch—1 ♂; St. Cloud, Aug. 6, 1938, Hubbell and Friauf—1 ♀; 18.9 miles west of the Brevard County line on Highway 192, Apr. 1, 1939, Cat. 1083—3 ♂♂, 5 ♀♀; 26.6 miles west of the Brevard County line on Highway 192, Apr. 1, 1939, Cat. 1084—5 ♂♂, 8 ♀♀. *Pasco Co.:* Dade City, Apr. 7, 1938, W. J. Gertsch—7 ♂♂, 7 ♀♀. *Pinellas Co.:* St. Petersburg, Nov. 30, 1933, Cat. 253—1 ♂; Clearwater, July 6, 1938, W. Beck—4 ♂♂, 15 ♀♀; Twp. 27 S, R 15 E, Sec. 8 and 9, Aug. 17, 1938, Hubbell—1 ♂. *Sarasota Co.:* Englewood, July 19, 1937, M. and A. Carr—2 ♂♂, 6 ♀♀.

REMARKS.—These spiders occupy a variety of situations in Florida but seem most characteristically found in coastal or sandy areas which support sand scrub associations. Adult males and females are found throughout the year.

Lycosa ericeticola, new species

Figures 12, 13, 22

HOLOTYPE.—Male, from 8.6 miles east of the county line on Fla. 14, Putnam Co., Fla., Mar. 31, 1939, Cat. 1068; allotype, a female with the same data; both in the collection of The American Museum of Natural History, New York.

DESCRIPTION OF HOLOTYPE: In alcohol. Femora and dorsum of abdomen near Capucine Orange, carapace near Xanthine Orange. Dorsal stripe indistinct in front of dorsal groove, narrows posteriorly; marginal light area indistinct, wider than dorsal stripe; pattern on carapace obscured by dense covering of light hairs; radial furrows somewhat darker than surrounding areas. Dorsum of abdomen immaculate except for hastate mark; covered as usual with black bristles; venter black; sternum darker than coxae, lighter than venter. Metatarsi and tarsi I and II, and distal half tibiae I, quite dark.

Carapace longer than wide (9.7 mm./7.5 mm.), 3.2 mm. high; width of the head 4.2 mm. Posterior eye quadrangle wider than long (2.7 mm./2.0 mm.), eyes of the median row larger than those of the posterior (1.0 mm./0.8 mm.); median row wider than the anterior row (2.1 mm./1.7 mm.). Anterior row of eyes procurved; medians slightly closer to each other than to the laterals; medians twice as large as laterals (0.5 mm./0.2 mm.). Lower margin of the furrow of the chelicerae armed with three teeth, about equally spaced, lateral tooth smaller than the other two. Distance from the top of the posterior median eye to clypeus equals 1.5 mm. Palpal joints: femur 3.9 mm., patella 1.9 mm., tibia 1.9 mm., cymbium 3.7 mm. Legs 4123.

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	8.5	4.1	7.0	7.8	4.4	31.8
II	8.1	3.9	6.4	7.5	4.0	29.9
III	7.3	3.5	5.2	7.3	4.2	27.5
IV	9.1	3.8	7.5	10.4	5.0	36.2

DESCRIPTION OF ALLOTYPE.—In alcohol. Color and markings similar to those of the male, except metatarsi and tarsi I and II not dark; this is apparently a secondary sexual characteristic.

Carapace longer than wide (11.0 mm./8.3 mm.), 4.0 mm. high; width of the head 5.5 mm. Posterior eye quadrangle wider than long (3.1 mm./2.4 mm.), median eyes larger than posteriors (1.2 mm./0.9 mm.); median row wider than anterior row (2.5 mm./2.0 mm.). Anterior row of eyes procurved; medians slightly closer to each other than to the laterals; medians about twice as large as laterals (0.5 mm./0.2 plus mm.). Lower margin of the furrow of the chelicerae armed with three teeth, about equally spaced, lateral tooth smaller than the other two. Distance from the top of the posterior median eye to clypeus equals 1.7 mm. Palpal joints: femur 4.6 mm., patella 2.2 mm., tibia 2.5 mm., tarsus and claw 3.7 mm. Distance from the posterior edge of the epigynum to the anterior end of the furrow of the epigynum 1.6 mm. Legs 4123.

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	8.9	4.6	6.8	6.6	3.7	30.6
II	8.4	4.4	6.3	6.6	3.7	29.4
III	7.5	3.8	5.4	7.3	3.7	27.7
IV	9.4	4.2	7.6	10.6	4.8	36.8

This species is closely related to *L. miami*, new species, and *L. ammophila*, new species. Females of these three species cannot be readily distinguished, although, in general, the furrows of the epigynum are deeper in *miami* than in the other two. As already indicated the males of these species are similar in appearance, but they can be separated easily by comparing their median apophyses. That of *ericeticola* has a curved and pointed projection which is unlike that of any other species in this group.

SPECIMENS RECORDED.—20 ♂♂, 35 ♀♀, 17 juveniles = 72.

DISTRIBUTION.—Known only from Putnam County, Florida.

RECORDS.—FLORIDA: *Putnam Co.:* 16 miles west of Palatka on Highway 14, Aug. 3, 1935, Cat. 447—9 ♂♂, 19 ♀♀, 2 juv.; 8.6 miles east of county line on Fla. 14, Mar. 31, 1939, Cat. 1068—11 ♂♂, 16 ♀♀, 15 juv. Note: Although the mileage for the two records given above puts them more than ten miles apart, it may be that the first figure given is in error and that both collections were made at the same spot. The first collection was made on a dark night, and as a result I have no recollection of the appearance of the region collected. However, my notes describe, to some extent, the region where the second collection was made. This particular area is quite unusual in appearance for that part of the state—open sand with scattered bushes of Rosemary, no trees in the immediate vicinity, and very few grasses and herbs; a veritable island in aspect. I have since collected on either side of the type locality, along Highway 14, but have found *ericeticola* only in the area covered with Rosemary. It may be that this species occurs only in this particular area. *L. carolinensis* Walckenaer and *L. hentzi* Banks also occur here.

REMARKS.—The striking thing about this species is the distinct and different appearance of the median apophysis. This is all the more noteworthy when viewed in the light of the fact that it is the only means by which this population can be distinguished from several others. Add a very restricted range and an unusual ecology to the singular morphological divergence described above, and one is tempted to think that here we have a species formed as the result of a pronounced mutation which must have occurred rather recently.

Lycosa miami, new species

Figures 10, 11, 23

HOLOTYPE.—Male, from vacant lot near main canal in Miami Springs, Hialeah, Dade Co., Fla., July 6, 1937 (F. N. Young); allotype, a female with the same data; both in the collection of The American Museum of Natural History, New York.

DESCRIPTION OF HOLOTYPE.—In alcohol. Ground color of the legs and cephalothorax near Capucine Yellow; sides of carapace darker. Dorsal stripe extends from the posterior median eye to posterior margin of carapace; marginal light area wider than dorsal stripe. Dorsum of abdomen gray, with a hastate mark and chevrons behind. Sternum and venter black; coxae, labium and endites dusky. Legs not annulated, distal joints darker than femora. Lower margin of the furrow of the chelicerae armed with three subequal teeth, about equally spaced.

Carapace wider than long (7.4 mm./5.7 mm.), 2.9 mm. high; width of the head 3.4 mm. Posterior eye quadrangle wider than long (2.1 mm./1.8 mm.), eyes of the median row larger than those of the posterior (0.8 mm./0.7 mm.); median row of eyes wider than the anterior row (1.8 mm./1.5 mm.). Anterior row of eyes slightly procurved, eyes evenly spaced, medians

larger than laterals (0.4 mm./0.2 mm.). Distance from the top of the posterior median eye to clypeus equals 1.3 mm. Palpal joints: femur 3.1 mm., patella 1.4 mm., tibia 1.4 mm., cymbium 2.8 mm. Legs 4123.

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	6.8	3.1	5.3	5.8	3.3	24.3
II	6.2	2.9	4.9	5.5	3.2	22.7
III	5.7	2.5	3.9	5.3	2.9	20.3
IV	7.1	2.8	5.8	7.9	3.9	27.5

DESCRIPTION OF ALLOTYPE.—In alcohol. Ground color of the legs and cephalothorax near Orange; dorsal stripe extends from posterior margin of carapace to between the posterior median eyes; marginal light area wider than, but same color as, dorsal stripe. Dorsum of abdomen dusky, maculate with light and dark spots; with a hastate mark; venter black. Femora above with very faint indications of annulations; distal joints darker than femora. Guide, or median septum, of epigynum curved; irregularity in the shape of the guide is found also among some of the paratypes; however, some paratypes have straight guides (Fig. 23).

Carapace longer than wide (7.6 mm./5.5 mm.), 3.4 mm. high; width of the head 3.7 mm. Posterior eye quadrangle wider than long (2.3 mm./1.9 mm.), posterior median eyes larger than the posterior laterals (0.8 plus mm./0.7 mm.); posterior median row wider than the anterior row (1.9 mm./1.6 mm.). Anterior row of eyes procurved, eyes equally spaced, medians larger than laterals. Lower margin of the furrow of the chelicerae armed with three equal teeth, equally spaced. Distance from the top of the posterior median eye to clypeus equals 1.2 mm. Palpal joints: femur 3.0 mm., patella 1.6 mm., tibia 1.7 mm., tarsus and claw 2.5 mm. Distance from the posterior edge of the epigynum to the anterior end of the furrow of the epigynum 1.6 mm. Legs 4123.

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	6.0	3.1	4.6	4.3	2.7	20.7
II	5.7	2.8	4.2	4.2	2.5	19.4
III	5.1	2.5	3.6	4.5	2.7	18.4
IV	6.6	2.9	5.5	7.1	3.5	25.6

Both the holotype and allotype are small examples of this species. I have specimens that are half again as large, such variation in size being quite common in the "*lenta* group." I have often collected, within a few feet of one another, adult specimens of *lenta*, some of which were two or three times as large as others.

This species also varies in other respects. The genitalia, when compared from different regions and sometimes from the same region, have slightly different aspects, yet it would be almost impossible to describe these differences. So far I have been unable to correlate any of these variations with habitat or distribution, but it may be that larger series of specimens will show them to be characters of taxonomic significance.

L. miami seems to be near *L. ammophila*, new species, which has a more northerly distribution. Females of the two species are practically identical in every way. Generally speaking, the lateral furrows of the epigyna are deeper and narrower in *miami* than in *ammophila*. The males of these two species are quite distinct, as is clearly indicated in the figures of the palpi; *miami* may be confused with *pseudoceratiola*, the two having similar median apophyses, but they are distinct in external appearance and in the shape of the guide of the embolus.

L. miami is also close to *L. ericeticola*, new species. The females are indistinguishable, but the median apophyses of the males are quite distinct, as shown in Figs. 10–13.

SPECIMENS RECORDED.—31 ♂♂, 49 ♀♀, 39 juveniles = 119.

DISTRIBUTION.—At present known only from below 28° latitude in peninsular Florida; will probably be found as far north as 29°. Two records of females that are possibly this species are given below, one from Brevard and the other from Volusia counties. In the absence of males the latter records can only be provisional.

RECORDS.—FLORIDA: *Brevard Co.:* Melbourne, May 15, 1936, Cat. 556-A—1 ♀. *Broward Co.:* Ft. Lauderdale, Mar., 1919, Barbour and Smith—1 ♂ (M.C.Z.). *Collier Co.:* two miles south Naples, Dec. 21, 1932, A. F. and Tom Carr, Cat. 62—1 ♂. *Dade Co.:* Homestead, June 30, 1935, Cat. 435—1 ♂, 2 ♀♀. *De Soto Co.:* Arcadia, July 31, 1927, M. D. L.—1 ♀ (Cornell); 8 miles west of Arcadia, Mar. 31, 1938, W. J. Gertsch—4 ♂♂, 3 ♀♀. *Hardee Co.:* Wauchula, June 28, 1935, Cat. 427—3 ♂♂. *Hendry Co.:* 5 miles south of Moore Haven, June 29, 1935, Cat. 432—1 ♂, 2 ♀♀. *Indian River Co.:* Vero Beach, Mar. 17, 1936, H. T. Town-

send, Cat. 579—1 ♂; Vero Beach, Apr. 21, 1936, H. T. Townsend, Cat. 578—1 ♂, 3 ♀♀. *Lee Co.:* Ft. Myers, Apr. 24, 1927, Crescent Beach—1 ♀ (Cornell). *Okeechobee Co.:* Okeechobee, Mar. 27, 1938, W. J. Gertsch—5 ♂♂, 5 ♀♀. *Pinellas Co.:* Clearwater, Aug. 9, 1938, Causeway to Beach, W. Beck Sta. VI—2 ♂♂, 7 ♀♀. *Sarasota Co.:* Englewood, Bass Laboratory, Apr. 15, 1936, A. F. Carr, Jr.—5 ♂♂, 5 ♀♀, 23 immatures; Englewood, Mar. 1, 1937, W. M. Barrows—2 ♂♂, 1 ♀; Englewood, Chadwick Beach, July 19, 1937, M. and A. Carr—4 ♀♀ and immatures; Englewood, Mar. 1, 1938, W. J. Gertsch—2 ♂♂, 7 ♀♀, 2 penultimate ♂♂; Englewood, Chadwick Beach, Feb. 20, 1939, W. M. Barrows—2 ♂♂, 4 ♀♀, 2 penultimate ♂♂, 11 juveniles various sizes. *Volusia Co.:* near Benson Junction, Aug. 30, 1938, Hubbell and Friauf, Cat. 208—2 ♀♀.

REMARKS.—This species occurs on coastal beaches and in pine barrens. I have been unable to determine its ecological relationships from the available data. Its closest relatives, occurring farther north, are xeric, and *miami* may have similar habitat preferences.

Lycosa ammophila, new species

Figures 7, 8, 9, 21

HOLOTYPE.—Male, from "turkey oak" on road to Newman's Lake, Gainesville, Alachua Co., Fla., May 15, 1937; allotype, a female with the same data; both in the collection of The American Museum of Natural History, New York.

DESCRIPTION OF HOLOTYPE.—In alcohol. Ground color of legs and carapace between Cadmium and Xanthine Orange; dorsal stripe narrower than marginal light area, indistinct in front of dorsal groove, extends from the posterior end of the carapace to between the posterior median eyes. Sides of the carapace dusky with radially disposed dark streaks. Dorsum of abdomen near Tawny-Olive with a faint hastate mark, otherwise almost immaculate. Sternum and venter black; coxae and endites dusky. Legs not banded; metatarsi and tarsi I and II quite dark.

Carapace longer than wide (9.5 mm./7.2 mm.) 3.1 mm. high; width of the head 4.0 mm. Posterior eye quadrangle wider than long (2.7 mm./2.1 mm.), eyes of the median row larger than those of the posterior (1.1 mm./0.8 mm.); median row wider than the anterior row (2.2 mm./1.7 mm.). Anterior row of eyes procurved; medians slightly closer to each other than to the laterals; medians about twice as large as laterals (approximately 0.5 mm./0.3 mm.). Lower margin of the furrow of the chelicerae armed with three teeth, almost equally spaced, lateral tooth smaller than the other two. Distance from the top of the posterior median eye to clypeus equals 1.5 mm. Palpal joints: femur 4.1 mm., patella 1.9 mm., tibia 1.9 mm., cymbium 3.7 mm. Legs 4123.

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	8.9	4.0	7.5	8.0	4.5	32.9
II	8.4	3.9	6.9	7.7	4.4	31.3
III	7.5	3.5	5.6	7.6	4.1	28.3
IV	9.4	3.8	7.8	11.0	5.0	37.0

DESCRIPTION OF ALLOTYPE.—In alcohol. Color and markings similar to those of the male, not quite so dark on carapace.

Carapace longer than wide (10.7 mm./7.8 mm.), 3.7 mm. high; width of the head 5.2 mm. Posterior eye quadrangle wider than long (2.9 mm./2.3 mm.), median eyes larger than the posteriors (1.1 mm./0.9 mm.); median row wider than the anterior row (2.2 mm./1.9 mm.). Anterior row of eyes procurved, eyes almost equally spaced, medians almost twice as large as laterals (0.5 mm./0.3 mm.). Lower margin of the furrow of the chelicerae armed with three teeth, about equally spaced, the lateral tooth smaller than the other two. Distance from the top of the posterior median eye to clypeus equals 1.7 mm. Palpal joints: femur 4.2 mm., patella 2.1 mm., tibia 2.3 mm., tarsus and claw 3.5 mm. Distance from the posterior edge of the epigynum to the anterior end of the furrow of the epigynum 1.7 mm. Legs 4123.

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	8.3	4.3	6.2	5.8	3.5	28.1
II	7.7	4.1	5.7	5.8	3.7	26.8
III	6.8	3.6	4.9	6.4	3.7	25.4
IV	8.8	3.9	6.9	9.8	4.2	33.6

The holotype and paratypes of this species from central Florida are characterized by the almost straight ventral shelf-like edge of the median apophysis. From Leon County westward the ventral edge of the median apophysis is bent, or V-shaped, with the angle apparently decreasing westward. In Putnam County, in central Florida, an occasional male is found with a palpus approaching the Leon County type; this, I believe, is a result of variation rather than intergradation. Although the evidence suggests the possibility of the existence of two or more distinct populations, I believe it will be best, for

the present, to treat them as one species. In presenting the data on collections the central and west Florida forms are kept separate.

The central Florida specimens with straight ventral edge of the median apophysis are as follows:

SPECIMENS RECORDED.—74 ♂♂, 175 ♀♀, 5 juv. ♂♂, 108 juveniles = 362.

DISTRIBUTION.—Central Florida north of 28° latitude, west to Madison County and northeast to the Georgia line. It has not yet been taken in Georgia.

RECORDS.—FLORIDA: *Alachua Co.:* Gainesville, Apr. 19, 1933, Cat. 147—1 ♂; Gainesville, road to Newnan's Lake, May 15, 1937—4 ♂♂, 3 ♀♀; Gainesville, road to Newnan's Lake, Mar. 18, 1938, W. J. Gertsch—13 ♂♂, 15 ♀♀. *Baker Co.:* 10.0 miles west of Baldwin, June 17, 1938, Cat. 1035—7 ♂♂, 9 ♀♀ and immatures (several females with young). *Citrus Co.:* Floral City, Apr. 2, 1937, Carr, Sherman, etc.—3 ♂♂, 2 ♀♀; 2 miles south of Floral City, Apr. 30, 1937, Cat. 604—7 ♂♂, 2 ♀♀. *Clay Co.:* near Lake Geneva, May 31, 1936, Cat. 558—♂♂, ♀♀; near Melrose, May 31, 1936, Cat. 558-A—3 ♂♂, 9 ♀♀; 3.0 miles north of Bradford-Clay County line on Highway 13, June 18, 1938, Cat. 1036—4 ♂♂, 16 ♀♀. (?)*Collier Co.:* 2 miles south of Naples, Dec. 21, 1932, A. F. and Tom Carr—1 ♂, 1 ♀. *Lake Co.:* Altoona, R. V. Chamberlin—1 ♀ (M.C.Z.); Eustis, June 25, 1935, Cat. 415—7 ♂♂, 17 ♀♀ (pine-oak woods west of landing field); 2 miles north of Leesburg on U. S. 441, Oct. 5, 1935, Cat. 474—4 ♀♀, immatures. *Levy Co.:* Cedar Keys, July 12, 1935, T. H. Hubbell—♀; 5.6 miles northeast of Cedar Keys on Highway 13, Apr. 9, 1937, Cat. 592—4 ♂♂, 32 ♀♀, 70 immatures, various sizes (one pair observed copulating); 6.7 miles northeast of Cedar Keys, Apr. 9, 1937, Cat. 594—1 ♂, 18 ♀♀, 30 immatures; 1 mile west of Alachua County line on Highway 13, Apr. 9, 1937, Cat. 597—2 ♀♀, immatures. *Madison Co.:* 6.0 miles west of Suwannee River, Feb. 4, 1938, F. N. Young—1 ♀. *Marion Co.:* Ocala National Forest, June 14, 1935, Cat. 411—2 ♂♂, 5 ♀♀. *Nassau Co.:* Highway 1 at Georgia-Florida line, Apr. 27, 1935—1 ♀. *Putnam Co.:* Levy Prairie, May 24, 1936, Cat. 557-A—7 ♂♂, 7 ♀♀; 3.1 miles east of county line on Highway 14, Mar. 31, 1939, Cat. 1067—8 ♂♂, 16 ♀♀, 5 juv. ♂♂, 8 immatures; 4.8 miles southeast of Palatka on Highway 28, Mar. 31, 1939, Cat. 1070—2 ♀♀.

The west Florida specimens with bent, or V-shaped, ventral edge of the median apophysis are as follows:

SPECIMENS RECORDED.—76 ♂♂, 84 ♀♀, 18 juv. ♂♂, 23 immatures = 201.

DISTRIBUTION.—Florida, from Leon County westward to Alabama and also on Santa Rosa Island.

RECORDS.—FLORIDA: *Escambia Co.:* Riverview, Apr. 6, 1934, Cat. 282—1 ♂; Santa Rosa Island, Nov. 5, 1938, Cat. 1062—2 ♂♂, 5 ♀♀, 2 juv. ♂♂, 4 immatures. *Leon Co.:* Tallahassee, Feb. 17, 1933, Cat. 95—3 ♂♂, 6 ♀♀; Bradford Slough, Feb. 17, 1933, Cat. 96—1 ♀; 11.0 miles east of Tallahassee, July 11, 1935, Cantrall, Cat. 485—♂♂, ♀♀; Lena Stein Ravine, Apr. 15, 1936, Cat. 537-A—20 ♂♂, 18 ♀♀, 3 juv. ♂♂, immatures; Lena Stein Ravine, Apr. 15, 1936, Cat. 537-B—3 ♂♂, 4 ♀♀, 2 juv. ♂♂, 4 immatures; Tallahassee, Apr. 16, 1936, Cat. 541—11 ♂♂, 11 ♀♀, 9 juv. ♂♂, 15 immatures various sizes; Seven Mile Pond, Apr. 16, 1936, Cat. 541-A—5 ♂♂, 8 ♀♀, immatures. *Liberty Co.:* Torreya State Park, Apr. 10, 1935, Cat. 382—1 ♂, 2 ♀♀; Torreya State Park, Apr. 11, 1935, Cat. 383-C—♂♂, ♀♀; Torreya Ravine, July 13, 1935, Cantrall—2 ♀♀; 11.2 miles south of River Junction, Apr. 18, 1936, Cat. 545—1 ♂; Bristol, Apr. 15, 1938, W. J. Gertsch—20 ♂♂, 24 ♀♀; Torreya State Park, Nov. 4, 1938, Cat. 1060—2 ♂♂, immatures; Little Sweetwater Creek, June 10, 1938, H. H. Hobbs—2 ♂♂. *Okaloosa Co.:* 1.6 miles east of Shoal River on U. S. 90, Aug. 11 and 12, 1935, T. H. Hubbell—1 ♂, 1 ♀; 4.9 miles west of Niceville, June 7, 1938, H. H. Hobbs—4 ♂♂, 4 ♀♀.

REMARKS.—In central Florida this species has a well-marked affinity for xeric habitats. In this region turkey oak and old

fields are the two commonest examples of *ammophila* habitat. In west Florida it is apparently not so closely restricted to xeric situations and is found in areas that appear to be mesic.

L. ammophila matures in March and April in central Florida, but adult males and females are found throughout the year. Members of this species quite commonly spin trap doors at the entrance to their burrows. This appears to be an adaptation to a life in loose, sandy soil, where there is little or no shade during parts of the year. Such doors not only cut out light and camouflage the entrances to burrows but also serve to keep the sandy walls of the burrow from crumbling.

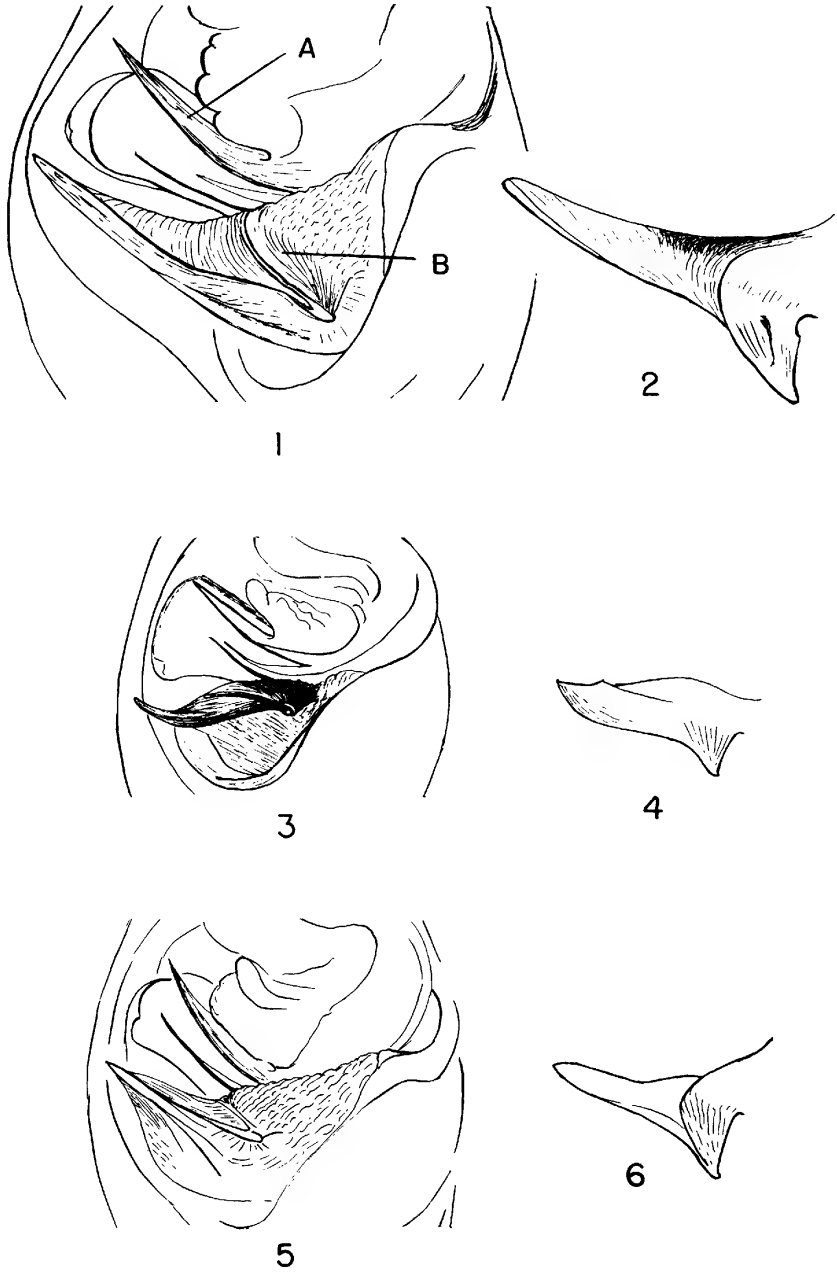

Fig. 1. *Lycosa lenta* Hentz, ventral view of male palpus. A, guide of the embolus. B, median apophysis.
Fig. 2. Idem, antero-ventral aspect of median apophysis.
Fig. 3. *Lycosa retenta* Gertsch and Wallace, ventral view of male palpus.
Fig. 4. Idem, antero-ventral aspect of median apophysis.
Fig. 5. *Lycosa timuqua*, new species, ventral view of male palpus.
Fig. 6. Idem, antero-ventral aspect of median apophysis.

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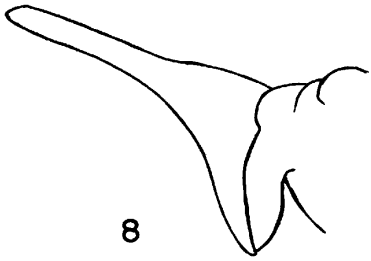

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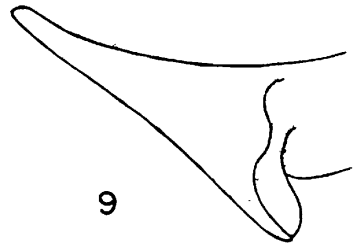

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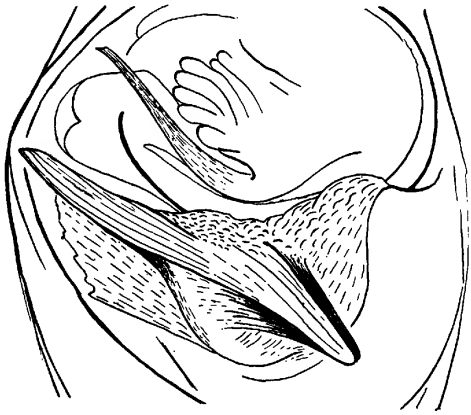

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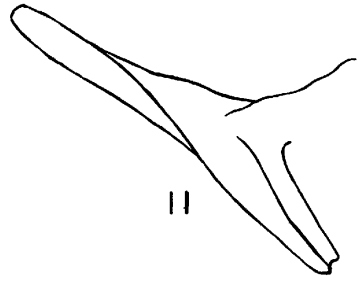

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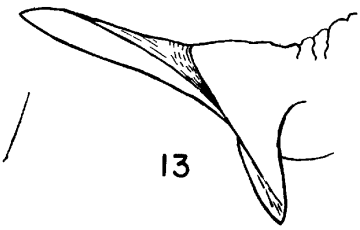
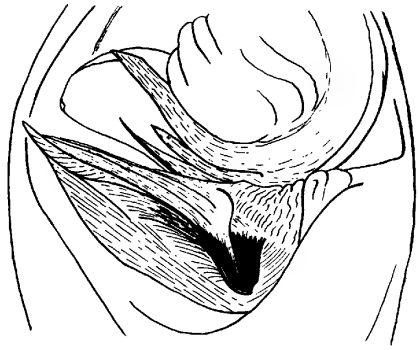
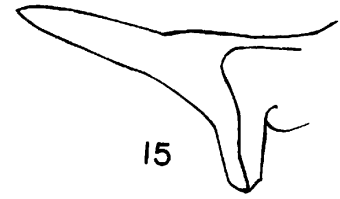
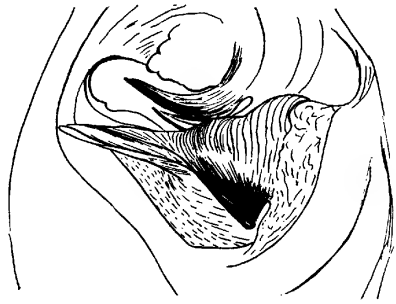
Fig. 7. *Lycosa ammophila*, new species, ventral view of male palpus of specimen from Alachua Co., Fla.
Fig. 8. Idem, antero-ventral aspect of median apophysis of specimens from Santa Rosa Island, Fla.
Fig. 9. Idem, antero-ventral aspect of median apophysis of specimen from Alachua Co., Fla.
Fig. 10. *Lycosa miami*, new species, ventral view of male palpus.
Fig. 11. Idem, antero-ventral aspect of median apophysis.









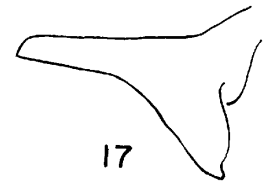
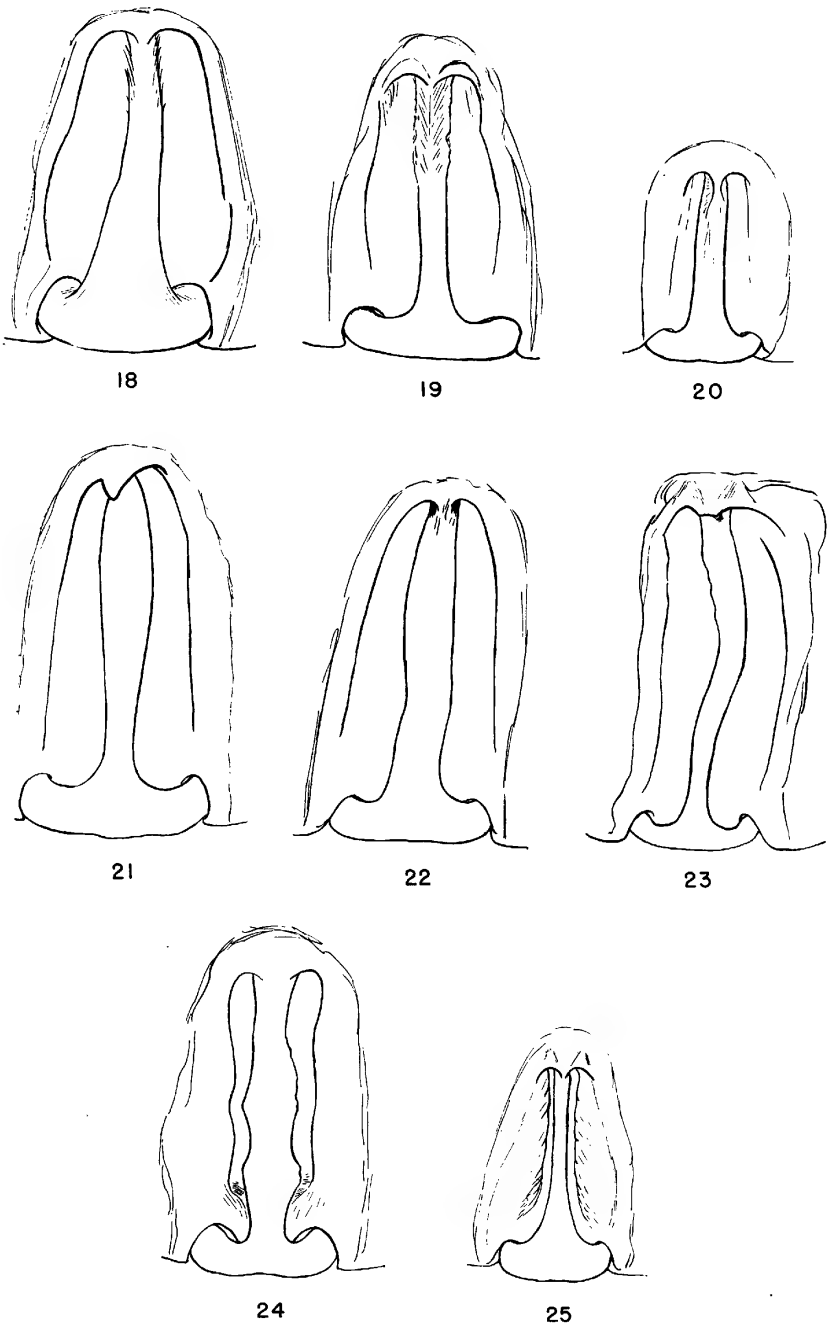


Fig. 12. *Lycosa ericeticola*, new species, ventral view of male palpus.
Fig. 13. Idem, antero-ventral aspect of median apophysis.
Fig. 14. *Lycosa pseudoceratiola*, new species, ventral view of male palpus.
Fig. 15. Idem, antero-ventral aspect of median apophysis.
Fig. 16. *Lycosa tigana* Gertsch and Wallace, ventral view of male palpus.
Fig. 17. Idem, antero-ventral aspect of median apophysis.



VENTRAL VIEW OF EPIGYNA OF FEMALES

Fig. 18. *Lycosa lenta* Hentz.
Fig. 19. *Lycosa timuqua*, new species, central peninsular form (Clearwater, Fla.).
Fig. 20. Idem, typical form.
Fig. 21. *Lycosa ammophila*, new species.
Fig. 22. *Lycosa ericeticola*, new species.
Fig. 23. *Lycosa miami*, new species.
Fig. 24. *Lycosa pseudoceratiola*, new species.
Fig. 25. *Lycosa tigana* Gertsch and Wallace.

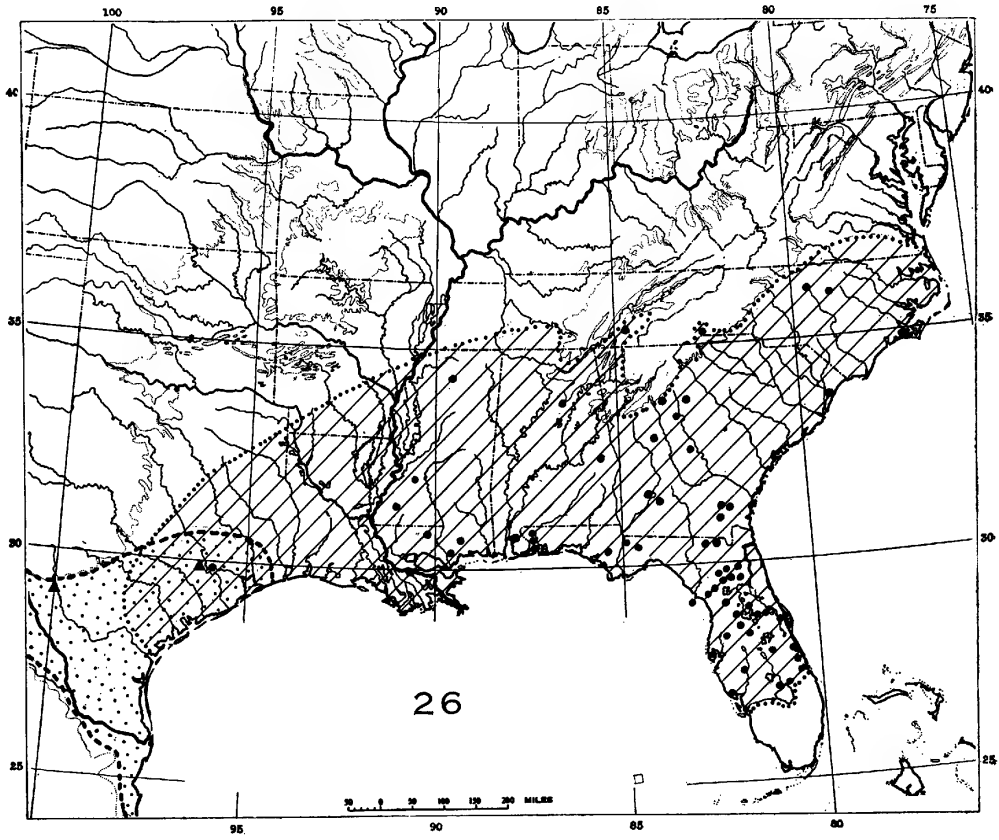


Fig. 26. Distribution of Sub-group 1 of Group B. ● *L. lenta* Hentz. ▲ *L. retenta* Gertsch and Wallace.

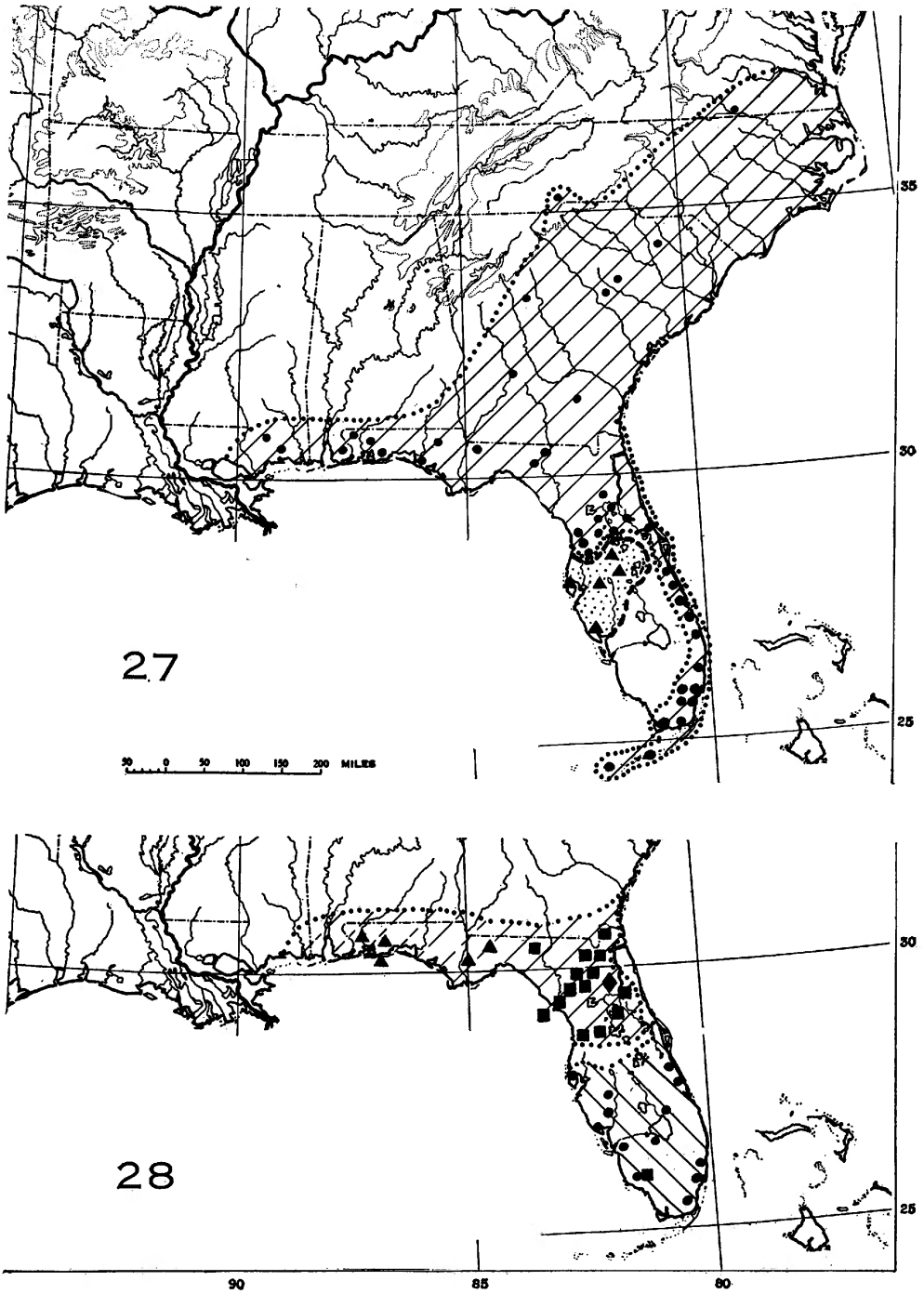


Fig. 27. Distribution of Sub-group 2 of Group B. ● *L. timuqua*, new species. ▲ *L. timuqua*, new species, central peninsular form.

Fig. 28. Distribution of Sub-group 3 of Group B. ■ *L. ammophila*, new species, eastern form. ▲ *L. ammophila*, new species, western form. ◆ *L. ericeticola*, new species. ● *L. miami*, new species.